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Supplementary material

Seasonal distributions and sources of low molecular weight dicarboxylic acids, ω-oxocarboxylic acids, pyruvic acid, α-dicarbonyls and fatty acids in ambient aerosols from subtropical Okinawa in the western Pacific Rim

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Table S1. Correlation coefficients (*r*) among selected diacids and related compounds in winter

Note: we categorised the *r*-values in Tables S1–S4 as strong ($r \geq 0.80$), good ($0.60 \leq r \leq 0.80$), fair ($0.3 \leq r \leq 0.5$) and very weak correlation ($r \leq 0.3$). Please refer to Table 1 of the main text for compound identities

Compounds	C_2	C_3	C_4	hC_4	kC_3	Pyr	Gly	MeGly	ωC_2
C_2	1								
C_3	0.83	1							
C_4	0.68	0.80	1						
hC_4	0.20	0.54	0.64	1					
kC_3	0.42	0.49	0.43	0.56	1				
Pyr	0.39	0.54	0.48	0.38	0.83	1			
Gly	0.73	0.01	0.01	0.41	0.60	0.01	1		
MeGly	0.10	0.02	0.23	0.23	0.49	0. 20	0.70	1	
ωC_2	0.45	0.64	0.55	0.55	0.79	0.95	0.95	0.23	1

Table S2. Correlation coefficients (*r*) among selected diacids and related compounds in spring

Please refer to Table 1 of the main text for compound identities

Compounds	C_2	C_3	C_4	hC_4	kC_3	Pyr	Gly	MeGly	ωC_2
C_2	1								
C_3	0.89	1							
C_4	0.84	0.74	1						
hC_4	–0.33	–0.30	0.68	1					
kC_3	0.68	0.55	0.75	–0.29	1				
Pyr	0.83	0.78	0.93	–0.30	0.63	1			
Gly	0.27	0.01	0.55	–0.28	0.41	0.48	1		
MeGly	0.38	0.12	0.53	–0.01	0.11	0.55	0.75	1	
ωC_2	0.76	0.68	0.88	–0.33	0.66	0.95	0.37	0.43	1

Table S3. Correlation coefficient (*r*) among selected diacids and related compounds in summer

Please refer to Table 1 of the main text for compound identities

Compounds	C_2	C_3	C_4	hC_4	kC_3	Pyr	Gly	MeGly	ωC_2
C_2	1								
C_3	0.95	1							
C_4	0.96	0.90	1						
hC_4	0.25	0.43	0.2	1					
kC_3	0.99	0.93	0.97	0.10	1				
Pyr	0.98	0.93	0.96	0.20	0.98	1			
Gly	–0.07	–0.20	–0.09	–0.20	–0.04	–0.10	1		
MeGly	0.82	–0.26	–0.10	–0.20	–0.05	–0.10	0.96	1	
ωC_2	0.99	0.93	0.98	0.20	0.99	0.98	–0.08	–0.10	1

Table S4. Correlation coefficient (*r*) among selected diacids and related compounds in autumn

Please refer to Table 1 of the main text for compound identities.

Compounds	C_2	C_3	C_4	hC_4	kC_3	Pyr	Gly	MeGly	ωC_2
C_2	1								
C_3	0.91	1							
C_4	0.84	0.80	1						
hC_4	0.16	0.10	0.01	1					
kC_3	0.73	0.62	0.74	0.17	1				
Pyr	0.70	0.62	0.79	0.00	0.66	1			
Gly	–0.03	0.09	0.05	0.00	–0.30	–0.10	1		
MeGly	–0.07	–0.29	0.00	0.09	–0.20	–0.10	0.05	1	
ωC_2	0.72	0.68	0.82	–0.30	0.68	0.97	–0.07	0.16	1

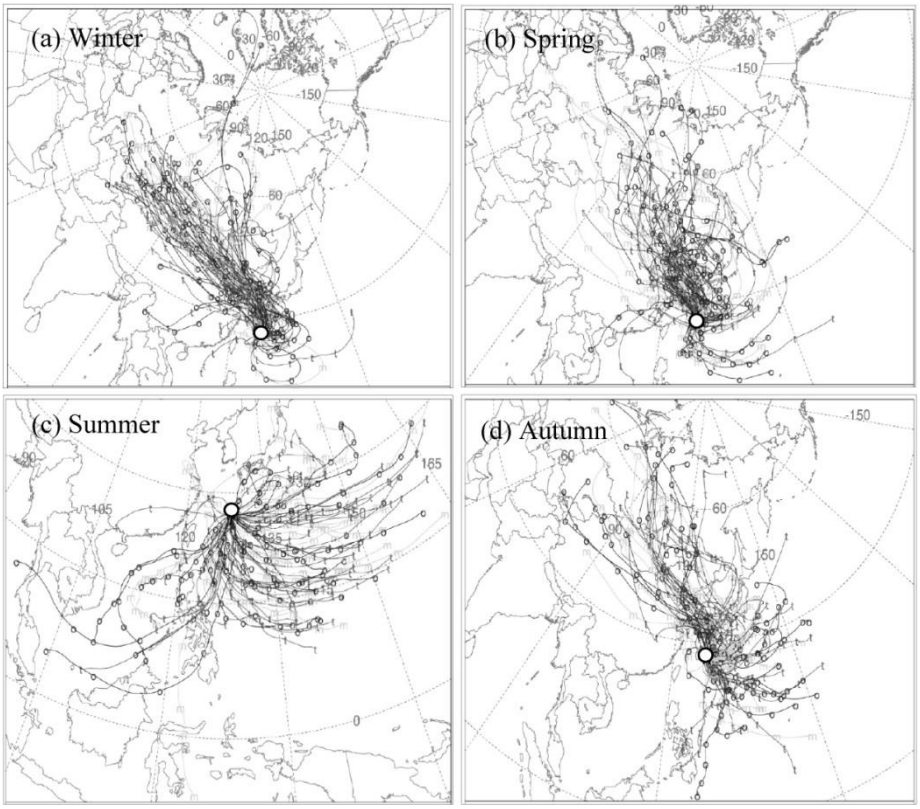

Fig. S1. Five-day backward trajectory analysis for winter (December, January and February), spring (March, April and May), summer (June, July and August) and autumn (September, October and November). Data from Kunwar and Kawamura.[1] Backward trajectories at 500 m above ground level were drawn with the NOAA HYSPLIT model.

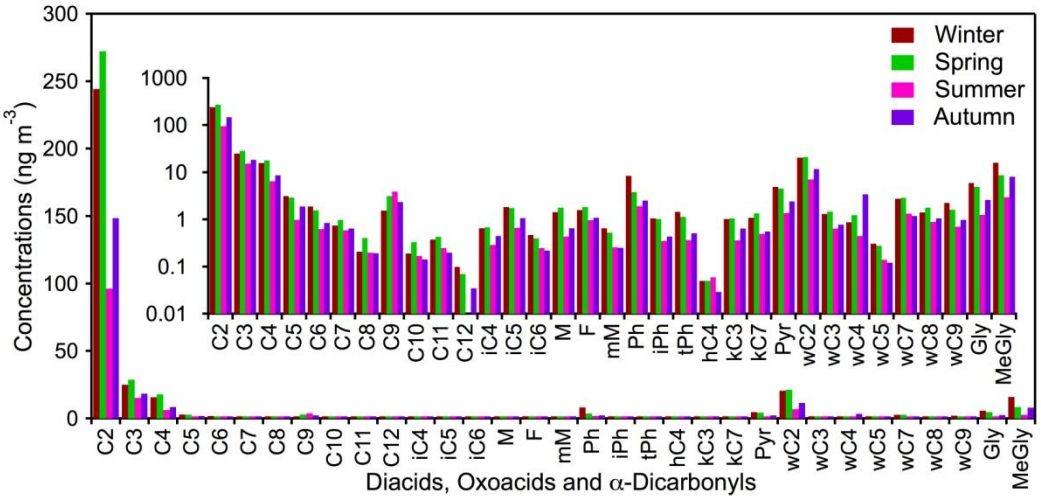

Fig. S2 Seasonally averaged molecular distributions of straight chain diacids (C_2–C_{12}), branched chain diacids (iC_4–iC_6), unsaturated diacids (M, F, mM, Ph, iPh, and tPh), multifunctional diacids (hC_4, kC_3 and kC_7), oxoacids (ωC_2–ωC_9), pyruvic acid, and α-dicarbonyls (Gly and MeGly) in aerosols collected at Cape Hedo from October 2009 to October 2010. Lower panel represents normal scale and upper panel represents log scale.

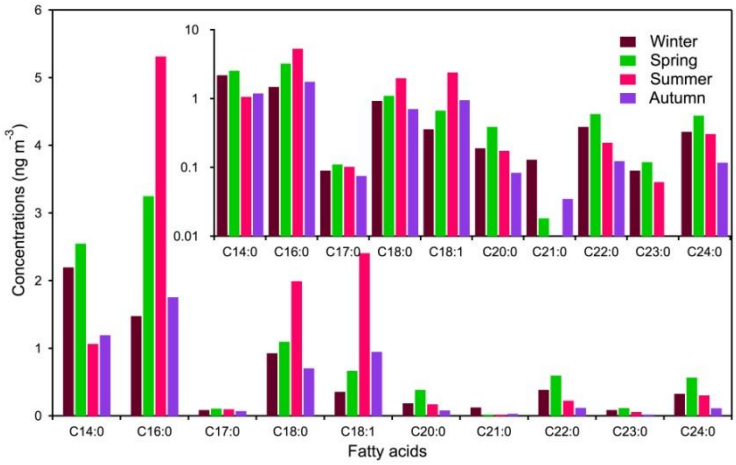

Fig. S3. Seasonally averaged molecular distributions of fatty acids in aerosols collected from Cape Hedo, Okinawa during October 2009 to October 2010. The first number of the fatty acid indicates the number of carbon atoms whereas the second number indicates the number of double bonds. Lower panel represents normal scale and upper panel represents log scale. $C_{15:0}$ and $C_{19:0}$ were not shown here because they were not detected in the samples.

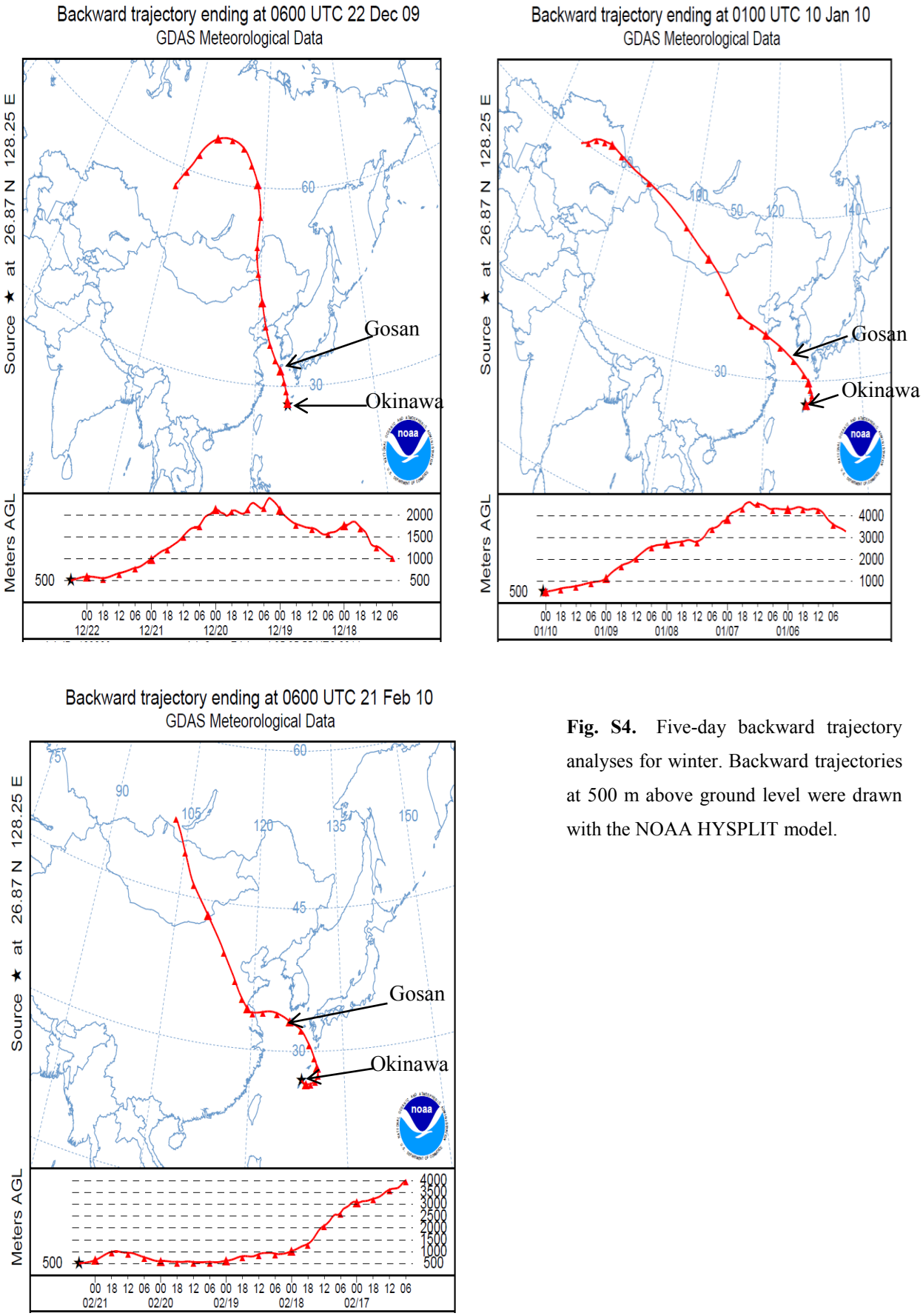

Fig. S4. Five-day backward trajectory analyses for winter. Backward trajectories at 500 m above ground level were drawn with the NOAA HYSPLIT model.

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Reference

[1] B. Kunwar, K. Kawamura, One-year observations of carbonaceous and nitrogenous components and major ions in the aerosols from subtropical Okinawa Island, an outflow region of Asian dusts. *Atmos. Chem. Phys.* **2014**, *14*, 1819.